

Lean Accounting & Throughput Accounting

Peter Milroy, CMA

Constraints Management Systems Inc.

Presentation Objective

- Equip you with the understanding of what people mean when they say ‘Lean Accounting’
- Give you the knowledge to differentiate Throughput Accounting from Lean Accounting

Flow of the Discussion

- Very quick overview of Throughput Accounting
- Background on Lean Accounting
- Overview of Lean Manufacturing
- How Lean Accounting fits with Lean Manufacturing
- Conclusions

Throughput Accounting (TA)

- Measurement and decision-making tools that align analysis with bottom-line results
- Simple, common-sense financial categories aligned with generating sales (throughput), improving cash flow (investment) and providing capacity (operating expense)
 - All measurements and decision-making approaches are based on 'relevant cash flows' – no allocations are used
- The system constraint(s) provide the basis for our understanding of which cash flows are relevant at any time

Performance Measurement with TA

- Global performance:

	Feb	Mar
– Total throughput \$\$\$	\$1,000	\$1,100
– Less operating expense \$\$\$	- <u>\$700</u>	<u>\$725</u>
– Equals net profit \$\$\$	= \$300	\$375
– With contained investment	\$2,500	\$2,500
– Productivity Level (T/OE)	143%	152%
– Inventory Turns (T/i) - \$1mm	12	13.2

- It is measured with similar frequency to financial accounting, the primary difference being the valuation of inventory

Decision Making with TA

- Every decision is assessed based on expected:
 - Changes in throughput – ΔT
 - Will we sell more / less if.....?
 - Will we change our raw material costs if.....?
 - Will we change our prices if.....?
 - Changes in investment – ΔI
 - Will our inventories go up / down if.....?
 - Will receivables/payables go up / down if.....?
 - Changes in operating expense – ΔOE
 - Will our staff levels go up / down if.....?
 - Will we need more / less outside contractor support if.....?
- Assessments are NOT made based on costs per part

Decision Making with TA

- As long as $(\Delta T - \Delta OE)$ is positive, the profit of your organization will increase
- As long as $(\Delta T - \Delta OE) \div \Delta I$ is > 1 , the return on investment (ROI) is positive
- For decisions with multi-year impact on T, I, and OE, we suggest using discounted cash flows to aid in these assessments

Product Profitability with TA

- Products generate throughput when they are sold, equal to the selling price less any totally variable costs
- The rate at which they generate profit is determined by the throughput per unit, divided by the time on the constraint
- Profit margin, contribution margin, all traditional measures of product profits mislead decision-makers about which products to emphasize in the market in order to increase organization profitability

Lean Accounting



Cost World

We want to minimize
the cost of capacity

Throughput Accounting

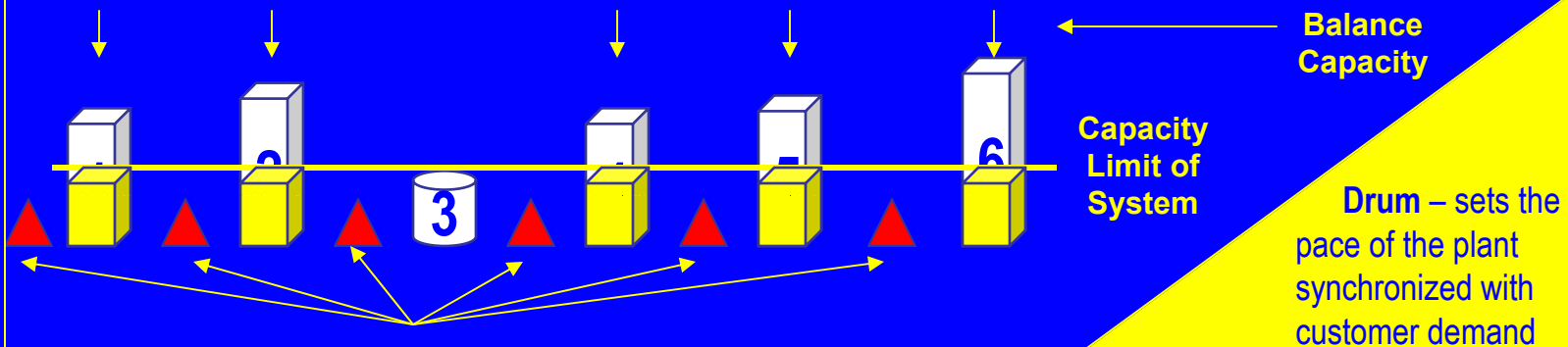


Throughput World

We want to maximize
the use of capacity

Background on Lean Accounting

- Client work
- Several books, all published in 2003 or 2004
- Several articles found in manufacturing journals, notably APICS magazine
- No more found on the internet about LA than on Throughput Accounting
- Wide range of opinions and writings on Lean Accounting
 - There does not appear to be a generally accepted set of justifications and techniques
 - Some based closely on Lean principles



Balance Capacity

Capacity Limit of System

Drum – sets the pace of the plant synchronized with customer demand

Kanban Location

Balanced Capacity – process of balancing the capacity of each work centre to the slowest operation

Kanban – pull signal designed to limit the amount of material in the system and maximize flow

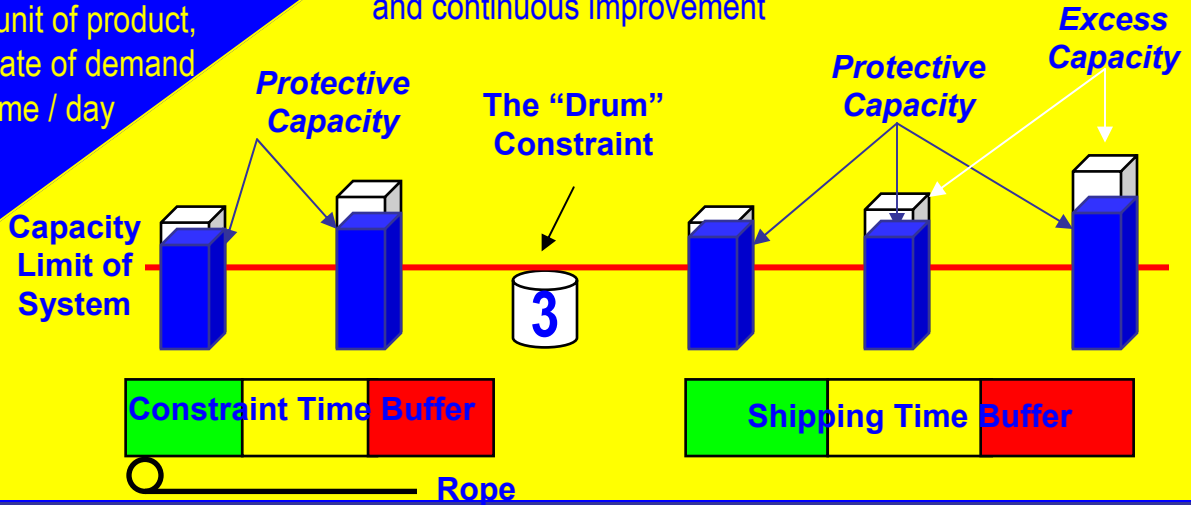
Takt Time – the amount of time allowed to produce one unit of product, based on the customer rate of demand and the available work time / day

Level Production – smoothing out the variations in daily customer demand

Buffer – protects the drum and the customer with time (Time Buffers)

Rope – releases work into the plant to the pace set by the drum

Buffer Management – directs shop floor control and continuous improvement



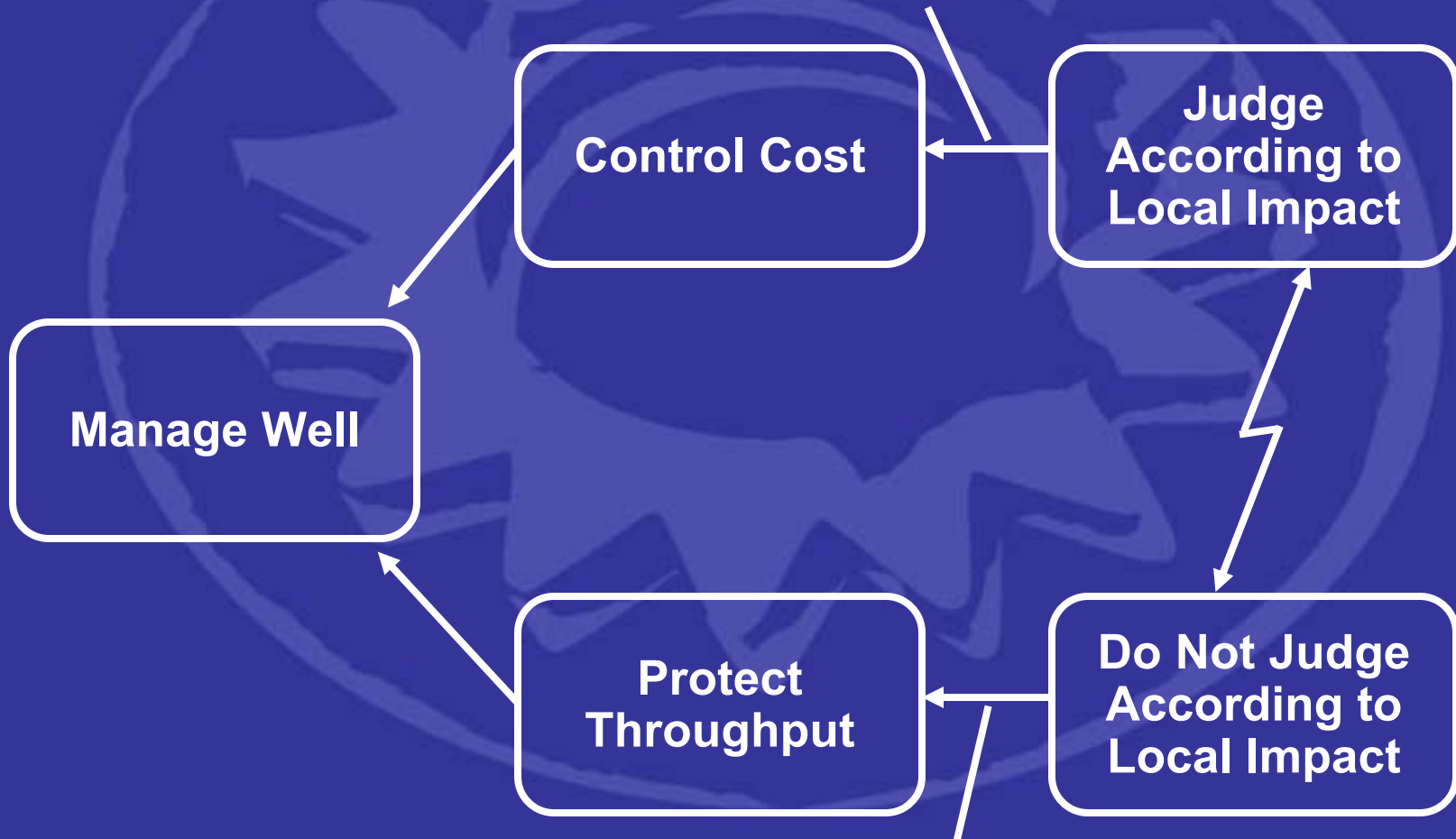
Constraint Time Buffer

Shipping Time Buffer

Rope

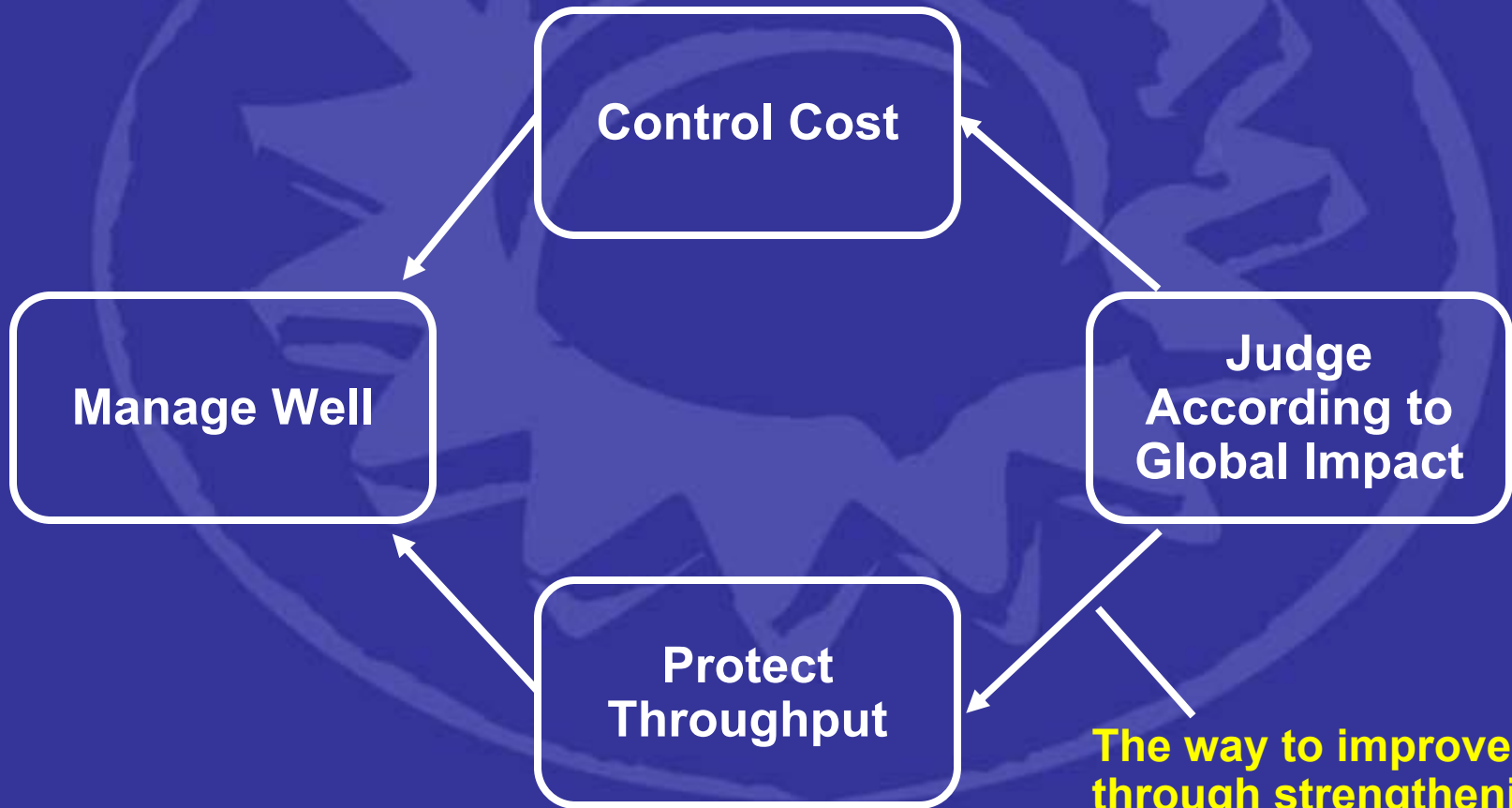
Measurement Conflict

Local impact is equal to the impact on the whole organization



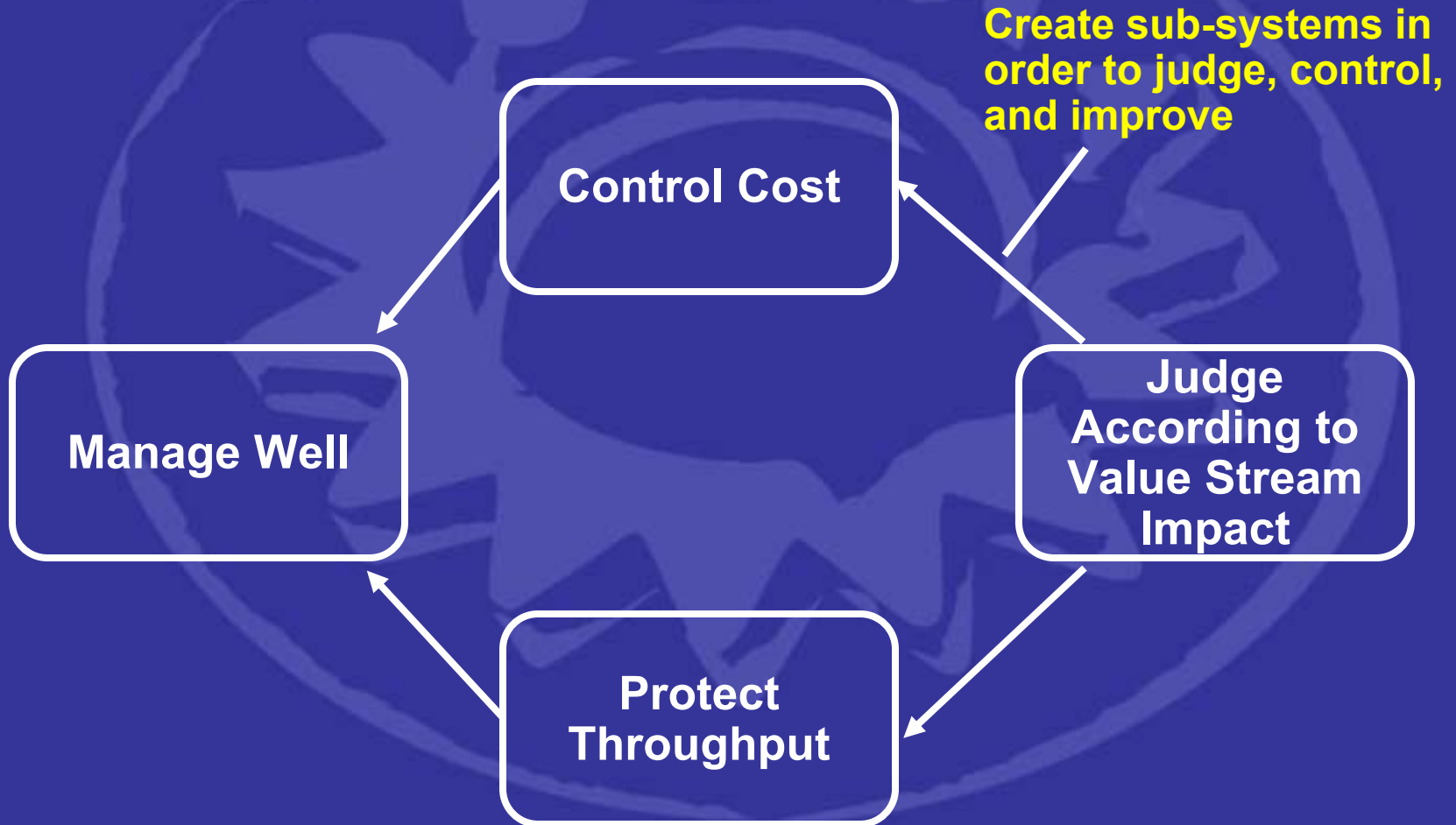
Local impact is NOT equal to the impact on the whole organization

TOC Resolution of the Conflict



The way to improve is through strengthening the weakest link

Lean's Attempt to Resolve the Conflict



What is Lean Accounting?



Value



- Value added activity:
 - An activity that adds value to the form, fit or function of a product or service, or an activity for which the customer is willing to pay
- Non value added activity:
 - Those activities that take time, resources, or occupy space, but do not add value to the product
 - Necessary:
 - Inspection; financial analysis;
 - Unnecessary:
 - Walking; rework; extra handling; searching for tools; fine tuning; unnecessary motion; transportation; setups

Source: Boeing Production System, Lean Manufacturing Pocket Guide, 1999



Value Streams

"...the set of all the specific actions required to bring a specific product through the three critical management tasks of any business:

...problem solving,

Sales, Design, Engineering

...information management,

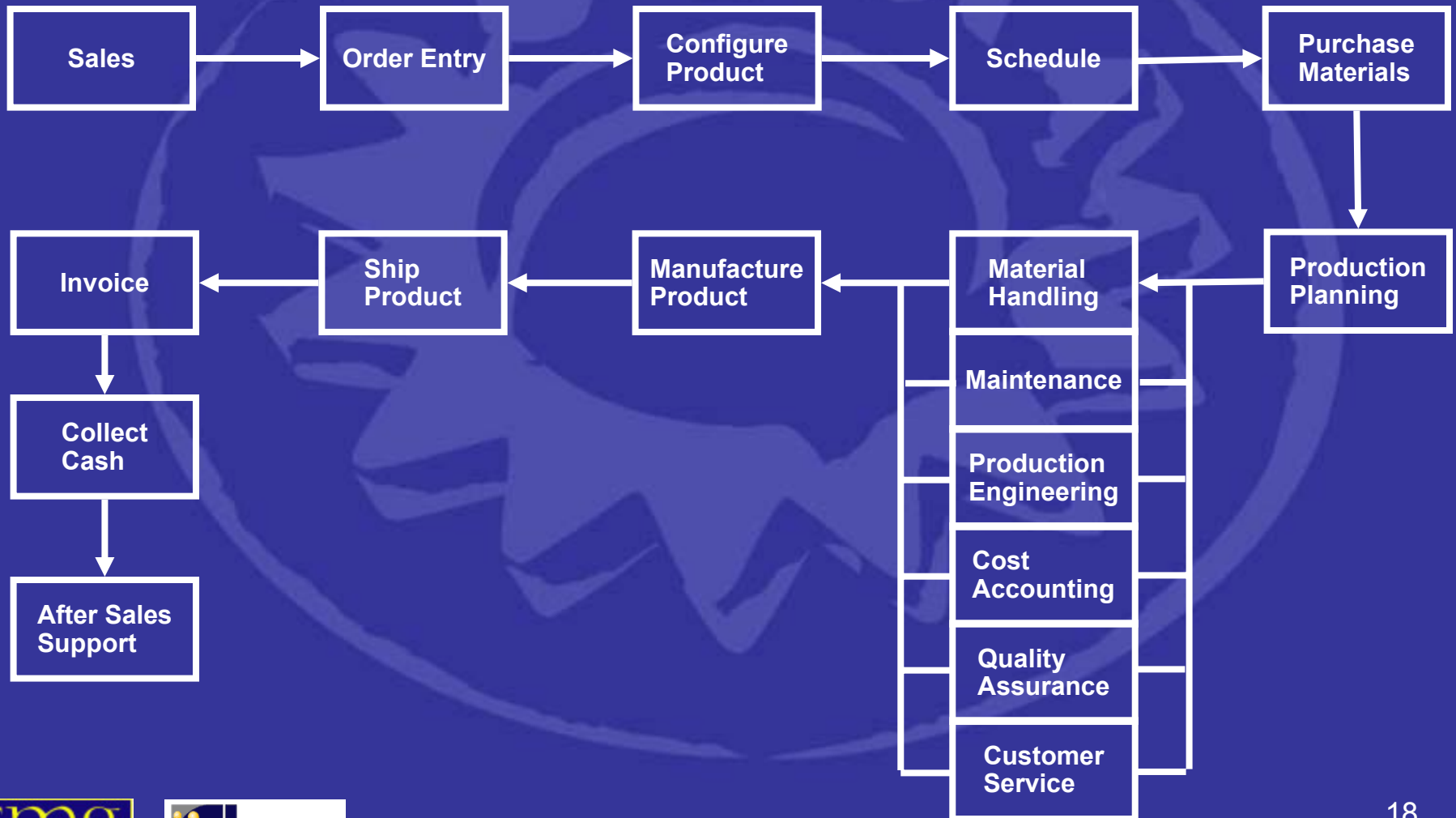
Logistics & Materials Management

...physical transformation".

Production, Maintenance, Quality

-Womack and Jones

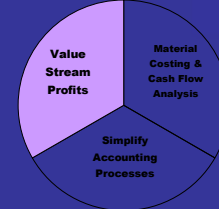
Generic Value Stream



Value Stream Costing



Knit athletic wear - Oct. 04	Material	Sub-contract	People	Operating Costs	Other	Total
Design		\$ 4,000	\$ 6,000			\$ 10,000
Purchasing			\$ 2,000			\$ 2,000
Fabric finishing	\$ 50,000		\$ 6,000	\$ 5,000		\$ 61,000
Cut/sew	\$ 20,000		\$ 10,000	\$ 3,000		\$ 33,000
Garment finishing	\$ 15,000		\$ 5,000	\$ 7,000		\$ 27,000
Warehouse			\$ 2,000	\$ 1,500		\$ 3,500
Shipping			\$ 1,000	\$ 1,500		\$ 2,500
Quality Assurance			\$ 1,000		\$ 1,000	\$ 2,000
Manufacturing Engineering			\$ 4,000		\$ 1,000	\$ 5,000
Maintenance		\$ 5,000	\$ 4,000	\$ 15,000		\$ 24,000
Accounting			\$ 2,000			\$ 2,000
Information Systems		\$ 1,000	\$ 2,000			\$ 3,000
	\$ 85,000	\$ 10,000	\$ 45,000	\$ 33,000	\$ 2,000	\$ 175,000



Value Stream Measures

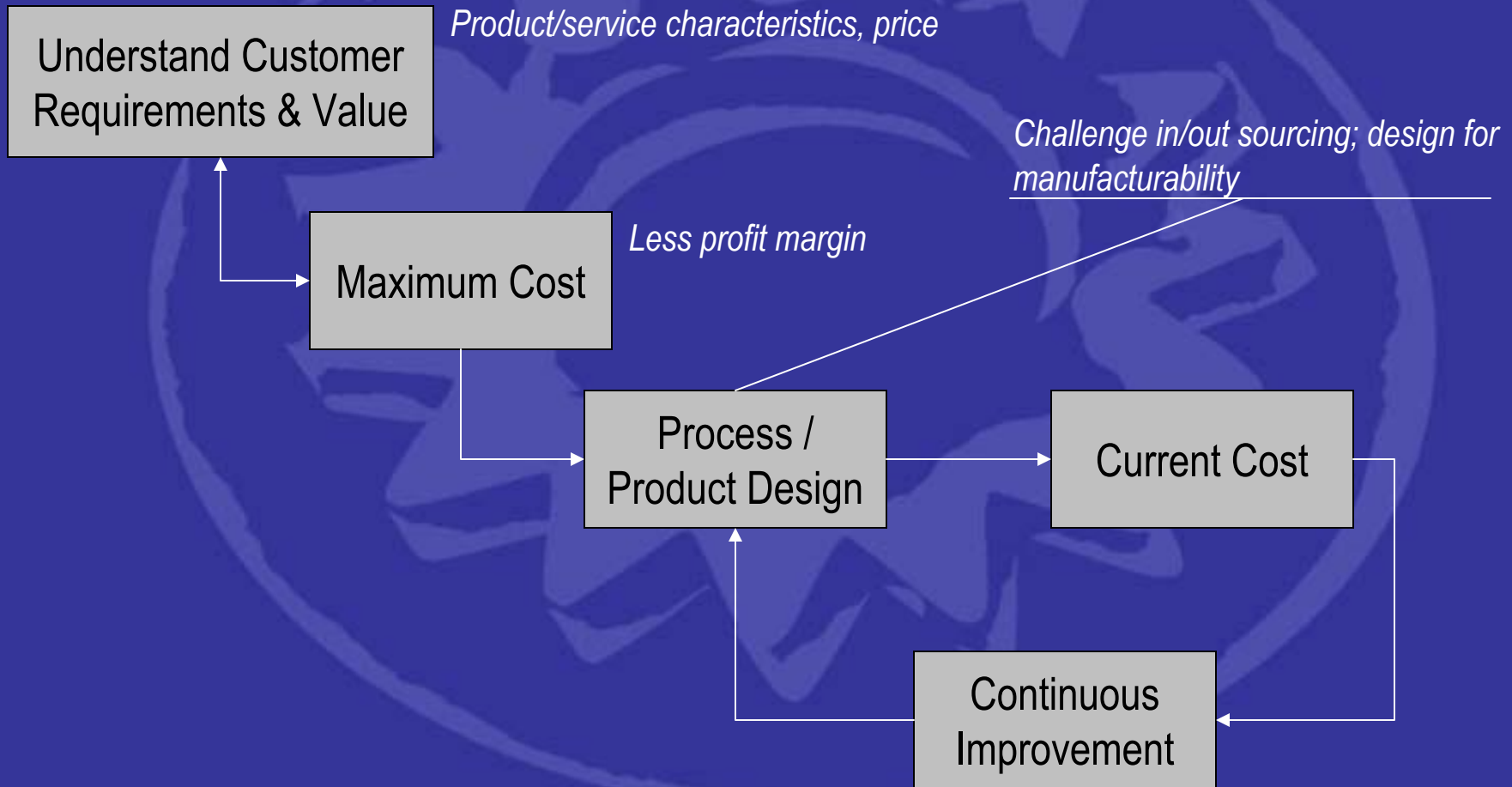
Knit athletic wear - Oct. 04

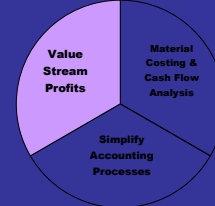
Sales			\$ 205,000
Material			\$ 85,000
Conversion Costs			
Sub-contract	\$ 10,000		
People	\$ 45,000		
Operating Costs	\$ 33,000		
Other	\$ 2,000	\$ 90,000	
Total Expenses		\$ 175,000	
Value Stream Profit		\$ 30,000	
Inventory Level		\$ 50,000	

Operational Measures

	Current	Oct. 04 Last	Δ
Knit Active Wear			
Order Lead Time	16	18	(2)
First time through	61%	57%	4%
On-time Delivery	83%	75%	8%
Space used	36,000	38,000	(2,000)
Sales/person	\$ 21,000	\$ 19,500	\$ 1,500
Avg. Cost / unit	\$ 11.50	\$ 11.75	\$ (0.25)
OEE	31%	32%	-1%

Target Costing





Value Stream Measures

Customer Satisfaction	Cost & Productivity	Flexibility & Responsiveness
Customer Satisfaction Index	Productivity Growth %	Defects per 1,000 Units
Customer Return %	Constant \$ Sales / Employee	Performance to Takt Time
Delivery Performance	Absenteeism	% of Time Each Cell meets Takt Time
Average Quoted Lead Time	Unplanned Downtime	Average First Pass Yield %
Late Shipments - \$		Raw Material Inventory \$
Late Shipments - # Units affected		WIP Inventory \$
Late Shipments - # Customers affected		FG Inventory \$
Abandoned Customer Phone Calls		Total Inventory, Days on Hand
% Customer Quotes Completed < 24hrs		

Value Stream Measures



Financial Performance	Safety & Ergonomics
Net Sales	Injuries
Operating Income as % of Sales	Medical Costs per 100 Associates
R&D Cost as % of Sales	Lost Time Accidents
% of Sales from New Products	
Capital Investment as % of Sales: <ul style="list-style-type: none"> ■ % for new products ■ % for capacity ■ % for safety, environmental etc. 	
Working Capital as % of Sales	

Alternate Lean Measures



Strategic Issues	Strategic Measures	Value Stream Measures	Cell/Process Measures
Increase cash flow	Sales Growth	Sales per person	Day-by-the-hour production
Increase sales and market share	EBITDA	On-time delivery	WIP levels
Continuous improvement culture	Inventory days	Lead time	First-time through
	Customer satisfaction	Average cost per unit	Operation Equipment Effectiveness
	Sales per employee	AR days outstanding	

Practical Lean Accounting; p. 27; Maskell & Baggaley, 2004

TOC Measures

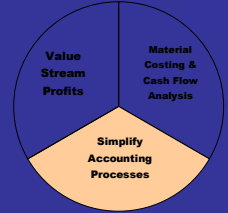
Strategic	Operational	Tactical
Cash Flows	Throughput	Throughput Dollar Days
Return on Investment	Investment; T/I	Inventory Dollar Days
	Operating Expenses; T/OE	Buffer Management
	Profit Velocity	Schedule Adherence
	Buffer Management	

Material Costing, Cash Flows

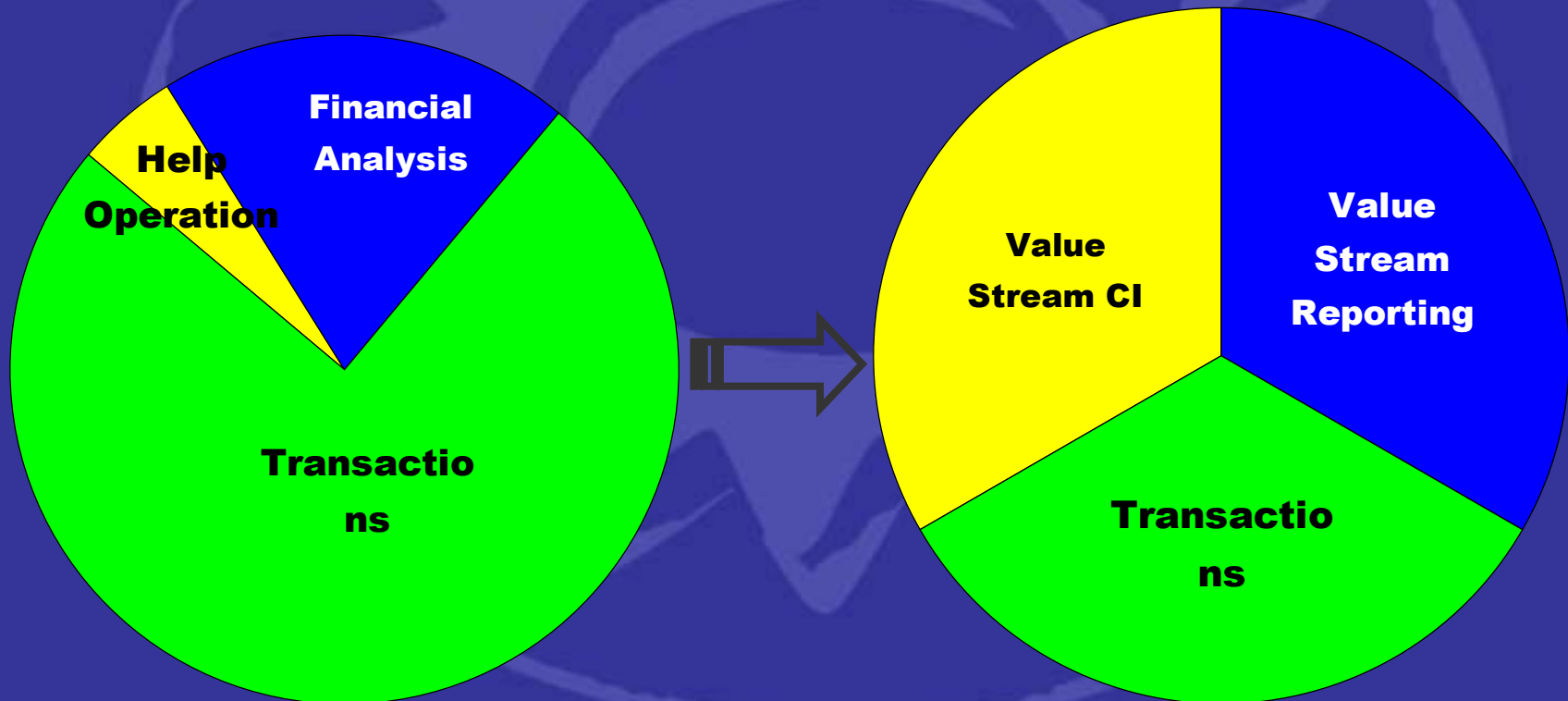


- Lean Accounting generally recognizes problems with standard costing & activity based costing, including:
 - Allocations of labour & overhead to the product will never be correct
 - Allocation processes are muda
 - Allocations can promote behaviours that are counter to lean operating practices
 - For decision making, examine the relevant cash flows

Accounting Processes



Lean Finance & Accounting Evolution



Accounting Processes



- One-day financial close; quarterly close
 - No accruals
 - Cash basis accounting
- General ledger simplification & reorganization
- Pay on receipt of materials

The bottom line on Lean Accounting

- It is a move in the right direction for management accounting
- If you need a bridge on your journey to throughput accounting, there are some good practices that ease the change
 - Relevant cost analysis
 - Simplified financial reporting

The Bottom Line on Lean Accounting - Cautions

- No recognition of a system constraint
 - Constraint provides certainty around changes in T, I, OE
 - Profit velocity measure gives valuable link between sales, design, engineering, and operations
- Facilitates the segmentation & dedication of resources
 - “Segment the market, not your resources”
- Value Stream improvement efforts prioritized based on gap between average cost and target cost
 - Buffer management highlights issues putting throughput at the greatest risk – thus the most important issues
- Heavy focus on irrelevant process improvement
 - Use 5 focusing steps to drive improvement

Lean Accounting



Cost World

We want to minimize
the cost of capacity

Throughput Accounting



Throughput World

We want to maximize
the use of capacity

Don't take my word on this.....

Total expenditures are currently tracked well.
Determining true costs of individual products is another matter.....

“The primary culprit in distorted product costs is overhead allocation.....

....and the primary effect is to undervalue many products and overvalue others. This, in turn, causes managers to make products that could better be outsourced. It also causes under pricing of products that actually lose money”

From “Lean Manufacturing Accounting Series”, Strategos Inc.; February 2004, www.strategosinc.com

Don't take my word on this.....

“Standard costing is not wrong, but it is inappropriate for lean manufacturing.....

Standard costing is a perfectly good method of calculating product costs for companies that are committed to mass production methods.”

From “Practical Lean Accounting”, pg. 4; Maskell & Baggaley; 2004,

Don't take my word on this.....

“One of the basic principles of performance measurement is to motivate the right decisions.....an alternate.....product costing method that could be employed is to allocate processing and occupancy costs based on product lead times. Lead time is.....process time plus inspection time plus move time plus wait time. Inspection, move and wait time are all (muda). Thus, as a process is improved, the product cost will be lower.”

From “Real Numbers”, pg. 99; Cunningham & Fiume; 2003,

Lean Accounting References

- Who's Counting?; Jerrold Solomon, 2003
- Practical Lean Accounting; Brian Maskell, Bruce Baggaley, 2004
- Real Numbers; Jean Cunningham, Orest Fiume, 2003
- Toward a New Model of Accounting in the Era of Lean; Gerald Najarian, APICS magazine, April 2004
- Lean Manufacturing Accounting Series; Quarterman Lee, Strategos Inc., February 2004

About Pete Milroy

- Director with CMS Inc., based in Ontario, Canada
- Certified Management Accountant
- TOCICO certified in Operations, Distribution, and Finance & Measures
- Has worked & consulted in automotive, re-manufacturing, construction, apparel/textile, high-tech industries, retail
- Has taught accounting at College and University levels
- Published several articles on replenishment, measurements

